

## ABSTRACT

A laser energy microinscribing system, comprising a semiconductor excited Q-switched solid state laser energy source; a cut gemstone mounting system, allowing optical access to a mounted workpiece; an optical system for focusing laser energy from the laser energy source onto a cut gemstone; a displaceable stage for moving said gemstone mounting system with respect to said optical system so that said focused laser energy is presented to desired positions on said gemstone, having a control input; an imaging system for viewing the gemstone from a plurality of vantage points; and a rigid frame supporting said laser, said optical system and said stage in fixed relation, to resist differential movements of said laser, said optical system and said stage and increase immunity to vibrational misalignments. The laser energy source is preferably a semiconductor diode excited Q-switched Nd:YLF laser with a harmonic converter having an output of about 530nm. The system may further comprise an input for receiving marking instructions; a processor for controlling said displaceable stage based on said marking instructions and said imaging system, to selectively generate a marking based on said instructions and a predetermined program; and a storage system for electronically storing information relating to images of a plurality of workpieces. A secure certificate of authenticity of a marked workpiece is also provided.